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Contributions to the static dielectric constant of low-*k* xerogel films derived from ellipsometry and IR spectroscopy

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Abstract

Silica xerogel films with low dielectric constant were prepared by means of a sol–gel spin-coating method using different aging and hydrophobisation conditions. Non-destructive variable angle spectroscopic ellipsometry (VASE) studies allow a complete characterization of the xerogel films, in terms of thickness, optical constants and void fraction. The electronic and ionic contributions to the static dielectric constant of the xerogel films were calculated from the refractive index in the visible range and from infrared transmission spectra, respectively. The origin of the differences between the contributions to the static dielectric constant of the xerogel films produced with different preparation conditions is discussed.

Author Keywords: Ellipsometry; Xerogel films; Low-*k* dielectric; Infrared spectroscopy